

Site Need Statement

General Reference Information	
1 *	Need Title: Variable Suction Level Transfer Pump
2 *	Need Code: RL-WT062
3 *	Need Summary: A transfer pump that can draw waste from pre-selected levels that range from the surface to within 10" or less of the tank bottom, and can be operated simultaneously with mixer pumps. The current baseline transfer pump achieves variable suction levels by using a flexible hose controlled by a tether cable. This design can't be operated simultaneously with mixer pumps because of hose instability and may be difficult to lower in viscous waste. Baseline transfer pumps that can be operated simultaneously with mixer pumps do not have variable suction level.
4 *	Origination Date: FY 2000
5 *	Need Type: Technology
6	Operation Office: Office of River Protection (ORP)
7	Geographic Site Name: Hanford Site
8 *	Project: Retrieval PBS No.: RL-TW04
9 *	National Priority: <u>X</u> 1. <u>High</u> - Critical to the success of the EM program, and a solution is required to achieve the current planned cost and schedule. ____ 2. <u>Medium</u> - Provides substantial benefit to EM program projects (e.g., moderate to high life-cycle cost savings or risk reduction, increased likelihood of compliance, increased assurance to avoid schedule delays). ____ 3. <u>Low</u> - Provides opportunities for significant, but lower cost savings or risk reduction, may reduce the uncertainty in EM program project success.
10	Operations Office Priority: High
Problem Description Information	
11	Operations Office Program Description: The overall purpose of the Retrieve and Transfer DST Waste function is to provide feed to the Waste Treatment Plant (WTP) and receive waste from SSTs. A primary objective of this function is to provide the tank farm infrastructure necessary to deliver waste to the WTP within established specifications. The baseline end state of the Retrieve and Transfer DST Waste function is: <ul style="list-style-type: none"> • Retrieval of all wastes from the DSTs • The safe, environmentally compliant transfer of this waste to the WTP • DSTs in a ready state for implementing closure and final disposal of the DST farms.
12	Need/Problem Description: The current design does not allow for simultaneous operations of the variable suction level transfer pump while the mixer pumps are operating. Only fixed suction level transfer pumps can be operated simultaneously with mixer pumps. The current baseline equips sludge tanks (HLW feed to the treatment plant) with fixed suction level transfer pumps, in order to allow solids suspension by mixer pump during transfers. However, some HLW tanks will need decanting capabilities for both the baseline process, and risk mitigation-type activities, such as contingency staging space for LAW feed. The current design equips the salt tanks (LAW feed to the treatment plant) with variable suction level transfer pumps, in order to enable decanting of the supernate and delivery of solid free LAW to the treatment plant, as required by the feed specification. The current design for these pumps (flexible hose) does not allow simultaneous mixer pump operation. However, these tanks may also require simultaneous mixer pump and transfer pump operation for specific situations, such as solids accumulation mitigation, or contingency space for HLW staging. A transfer pump that can draw waste from pre-selected levels that range from the surface to within 10" or less

	of the tank bottom, and can be operated simultaneously with mixer pumps is needed.
	** Program Baseline Summary (PBS) No.: TW04 ** Work Breakdown Structure (WBS) No.: 5.02.02.01.04 ** TIP No.:
13	Functional Performance Requirements: Conclusions from a demonstration must confirm these capabilities: <ul style="list-style-type: none"> • Pump 160 gpm @ approximately 880 ft head with SpG = 1.5 and viscosity of 30 cP • Withstand lateral forces from mixer pumps of up to 500 lb while operating • Operate in highly caustic waste (approx. 5% NaOH) • Pump liquid up to 200°F. • Variable suction level
	** Schedule Requirements: The results of this activity must be completed to provide design criteria and guidance to projects W-211 and W-521 to support feed delivery of LAW and HLW to the waste treatment plant. Based on the design requirements, the method selected may be able to be adapted to already complete designs. The demonstration should be completed no later than FY 2002 to generate the greatest benefit.
14	Definition of Solution:
15 *	Targeted Focus Area: Tank Focus Area (TFA)
16	Potential Benefits: Higher waste recovery
17 *	Potential Cost Savings: \$200,000,000
18 *	Potential Cost Savings Narrative: A potentially significant risk (unplanned cost) may be avoided if transfer pumps can be operated concurrently with mixer pumps. This unplanned cost would come from need for contingency staging space, or out-of-spec waste transfers that require additional time, analysis, tank transfers and potentially treatment delays. Each out-of-specification event could have cost impacts up to \$100K or more.
	** Technical Basis: Waste properties and process baseline show the need for both variable suction level transfer and simultaneous mixer/transfer pump operations in the same tank.
19	Cultural/Stakeholder Basis: N/A
20	Environment, Safety, and Health Basis: There are no identified environmental, safety or health issues associated with this activity over those already identified as part of the project.
21	Regulatory Drivers: There are no identified regulatory issues associated with this activity over those already identified as part of the project.
22 *	Milestones: Waste feed delivery milestones (2005 and onwards)
23 *	Material Streams: Sludge, salt, liquid (RL-HLW-20) ID-3857 HLW to Treatment Risk Score: 3
24	TSD System: Double Shell Tank systems ID-1722 Underground Storage Tanks Risk Score: 1
25	Major Contaminants: Pu-238, 239, 240, 241; AM-241; U-238; C-14; Ni-59/63; Nb-94; Tc-99; I-129; Cm-242; Sr-90; Cs-137; Sn-126; Se-79; chromium; nitrate; nitrite; complexants (EDTA/HEDTA)
26	Contaminated Media: Dominantly steel.
27	Volume/Size of Contaminated Media: Long length equipment.
28 *	Earliest Date Required: FY 2002
29 *	Latest Date Required: September 2009
Baseline Technology Information	
30	Baseline Technology/Process: Baseline technology is a line shaft pump modified with a flexible hose attached to the pump inlet. The flexible hose nozzle is raised and lowered using a hoist with cable attached to

	<p>the nozzle. The pump cannot be operated while the mixer pumps are operated due the flexible hose not being able to withstand the forces. The flexible hose can be raised and lowered to allow waste to be decanted at any elevation.</p> <p>Costs: Current baseline transfer pump cost is \$385,000 including the drive motor and variable frequency drive (VFD).</p> <p>Technology Insertion Point(s): N/A</p>
31	<i>Life-Cycle Cost Using Baseline:</i>
32	<i>Uncertainty on Baseline Life-Cycle Cost:</i>
33	<i>Completion Date Using Baseline:</i> 2018
Points of Contact (POC)	
34	<p><i>Contractor End User POCs:</i> C. E. (Carolyn) Graves, NHC, 509-376-5235, Carolyn_E_Cary_Graves@rl.gov</p>
35	<p><i>DOE End User POCs:</i> E.J. (Joe) Cruz, DOE-PRD, 509-372-2606, F/509-373-1313, E_J_Cruz@rl.gov</p>
36 **	<p><i>Other Contacts:</i> W. J. (Bill) Powell, CHG, 509-373-1072, William_J_Bill_Powell@rl.gov K.A. (Ken) Gasper, CHG, 509-373-1948, F/509-376-1788, Kenneth_A_Ken_Gasper@rl.gov</p>

*Element of a Site Need Statement appearing in IPABS-IS

**Element of a Site Need Statement required by CHG